Volunteer Lake Assessment Program Individual Lake Reports

GOVERNORS LAKE, RAYMOND, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	680	**Max. Depth (m):**	3	**Flushing Rate (yr^{-1})**	4
Surface Area (Ac.):	52	**Mean Depth (m):**	1.3	**P Retention Coef:**	0.64
Shore Length (m):	2,400	**Volume (m^3):**	328,500	**Elevation (ft):**	267

TROPHIC CLASSIFICATION

Year	Trophic class
1989	MESOTROPHIC
2004	MESOTROPHIC

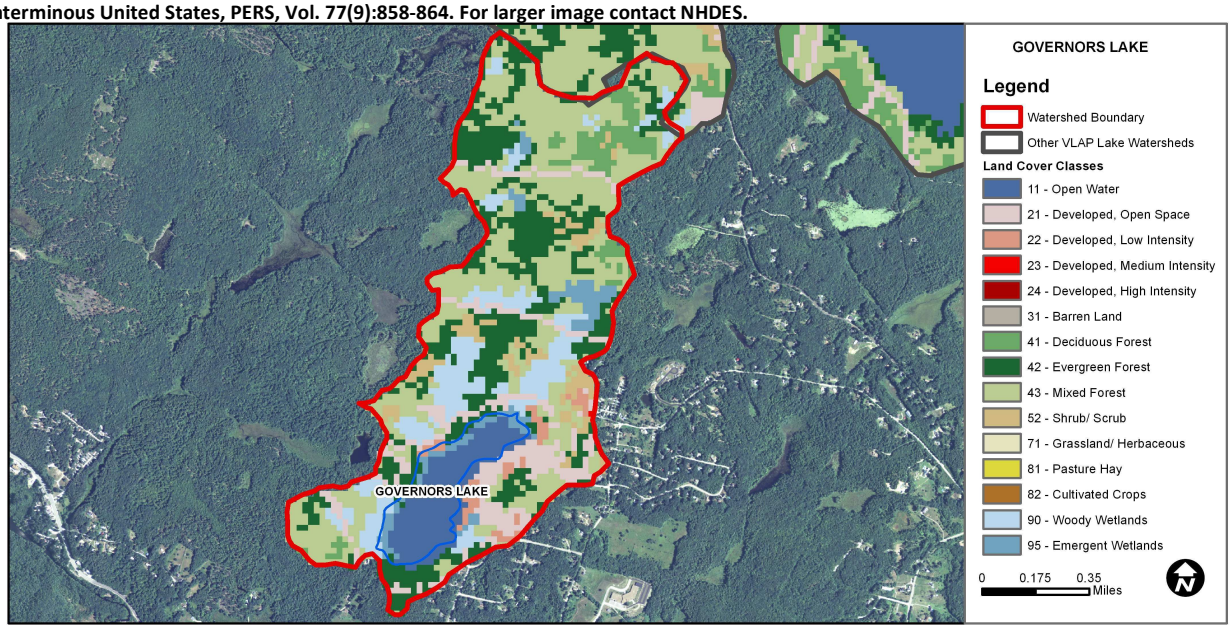
KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Volunteer Lake Assessment Program Individual Lake Reports

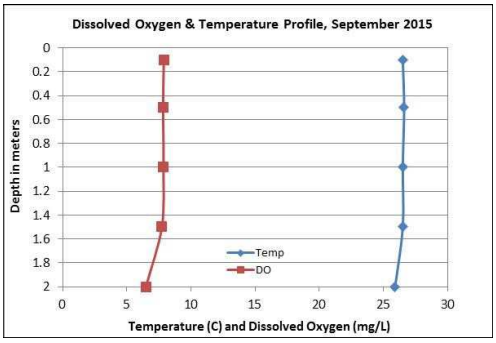
Governors Lake, Raymond

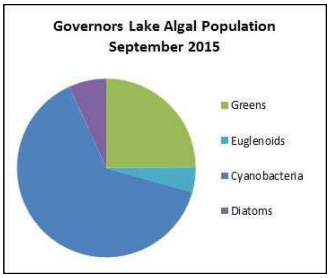
2015 Data Summary

Recommended Actions: Increase monitoring frequency to an annual basis and sample once per month during the summer, typically June, July and August. This will allow better assessment of seasonal water quality and historical water quality trends. Conduct Apparent Color analyses on deep spot samples to assess if the lake has become more "tea" colored or darker over time. The increased frequency and intensity of storm events highlights the importance of managing stormwater runoff in the watershed and maintaining vegetated buffers along the shoreline to minimize erosion. DES' "N.H. Homeowner's Guide to Stormwater Management" is a great resource. Lake conductivity levels have increased over time and is likely a result of winter road salt. Encourage local road agents and winter maintenance companies to obtain a NH Voluntary Salt Applicator license through UNH Technology Transfer Center's Green SnowPro Certification program. Contact the VLAP Coordinator in 2016 to schedule an annual biologist visit.

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were slightly elevated and greater than the state median in September. Visual inspection of historical data indicates relatively stable chlorophyll levels since monitoring began.
- **Conductivity/Chloride:** Epilimnetic (upper water layer) conductivity and chloride levels were elevated and greater than the state medians. Epilimnetic conductivity was the highest (worst) measured since monitoring began in 1989 and the above average winter snowfall and higher than normal application of de-icing materials likely contributed to the elevated conductivity. Visual inspection of historical data indicates increasing (worsening) epilimnetic conductivity since monitoring began. Outlet conductivity levels were also elevated.
- **Total Phosphorus:** Epilimnetic and Outlet phosphorus levels were elevated. Epilimnetic phosphorus was much greater than the state median and visual inspection of historical data indicates highly variable epilimnetic phosphorus levels since monitoring began.
- **Transparency:** Transparency was slightly below average for the lake likely due to wind and wave action at the deep spot. Transparency measured with the viewscope (VS) was better than that measured without (NVS) and likely a better representation of actual conditions. Visual inspection of historical data indicates relatively stable transparency since monitoring began.
- **Turbidity:** Epilimnetic and Outlet turbidities were slightly elevated in September. Algal growth may have contributed to the elevated epilimnetic turbidity. Low water levels may have also contributed to elevated turbidity as it may have concentrated organic acids making the water color appear darker and more turbid.
- **pH:** Epilimnetic and Outlet pH levels were within the desirable range 6.5-8.0 units, however historical data indicate epilimnetic pH has fluctuated below the desirable level. Visual inspection of historical data indicates highly variable epilimnetic pH since monitoring began.





Station Name	Table 1. 2015 Average Water Quality Data for GOVERNORS LAKE								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
						NVS	VS		
Epilimnion	11.0	6.29	40	169.9	23	1.50	1.98	3.69	6.70
Outlet				170.0	22			3.23	6.59

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	N/A	Ten consecutive years of data necessary for analysis.	Chlorophyll-a	N/A	Ten consecutive years of data necessary for analysis.
pH (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.	Transparency	N/A	Ten consecutive years of data necessary for analysis.
			Phosphorus (epilimnion)	N/A	Ten consecutive years of data necessary for analysis.